User's Manual

DPA 5100 Mobile Surround Microphone

DPA MICROPHONES

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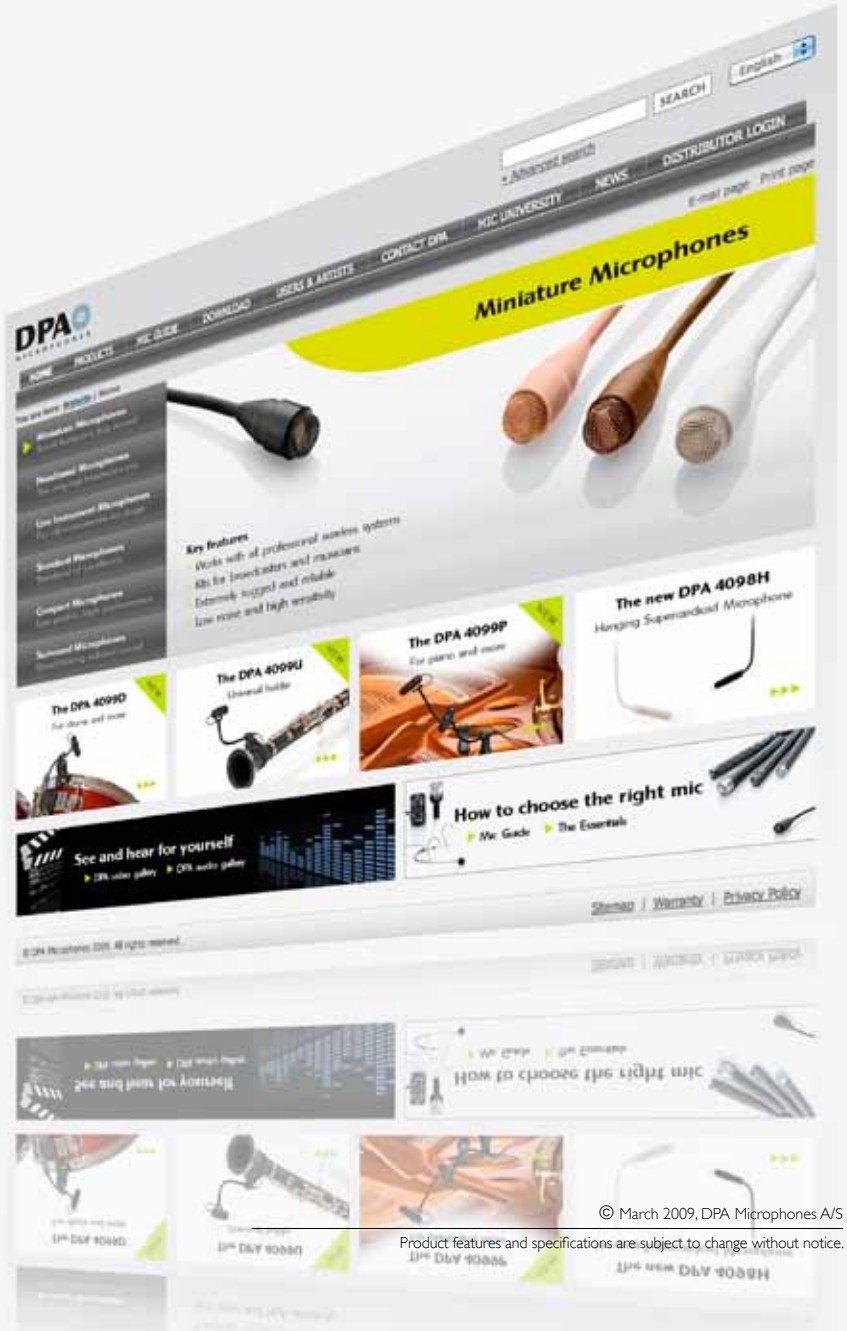

DPA MICROPHONES

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Product features and specifications are subject to change without notice.

General description

The DPA 5100 is an easy-to-use plug and play Mobile Surround Microphone. It has real-time 5.1 discrete analog output channels without any need for further signal processing. The sound character is very rich and has an enveloping three-dimensional surround atmosphere, yet with appropriate coherence, channel separation and localization accuracy.

The unit has an enormous dynamic range and low distortion, and is extremely light-weight (530 g/18.7 oz). It is primarily designed for professional use in (HDTV) television surround sound production as a "surround ambience adder", especially in connection with sports events, ambience recor-ding at different venues, documentaries, talk shows, film ambience and live music recording.

All microphones in the unit are pressure types as these types exhibit the lowest sensitivity to wind and a consistent low frequency response no matter the distance to the sound source. In order to reach adequate directional characteristics from a small unit with pressure-only capsules, the new unique DiPMic™ technology, designed by DPA Microphones, has been applied to this design.

DiPMic™ stands for Directional Pressure Microphone, and refers to the fact that even though we use pressure microphone capsules that natively result in pure omnidirectionality, directionality is obtained by mounting specially developed interference tubes on the microphones. This combines the best of two worlds: the pressure type's advantages in wind, handling and low distortion, and the directionality created by the acoustical grids.

To locate sound direction, the brain picks up crucial information about time, level and spectral differences. The 5100 Mobile Surround Microphone makes use of all these cue types. Besides using the DiPMic™ technology, the appropriate level differences between output channels in the 5100 is obtained using acoustic absorbing baffles between the microphones, as known from the Jecklin Disc A-B stereo principles.

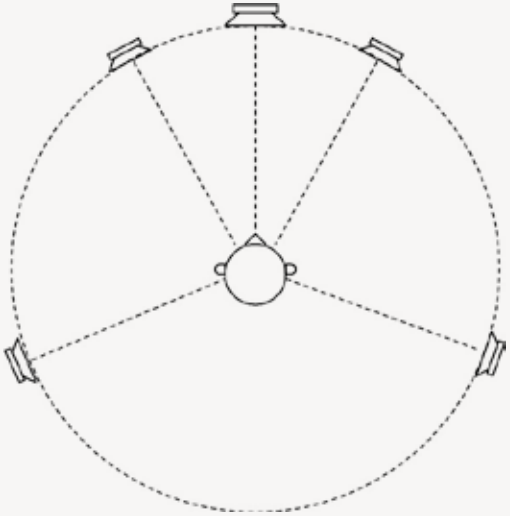
To create enough spaciousness to the surround field, some time arrival differences (decorrelation) is also needed. The rear microphones are spaced from each other and the front array, creating the desired time differences. The front microphones, on the other hand, are time coincident to ensure frequency consistency when down-mixing to mono.

5.1 surround sound playback system
In order for you to benefit fully from the intended surrounding effect of the 5100, it is advisable that you are familiar with the 5.1 surround playback setup.

"5" refers to the number of full range discrete channels, ".1" refers to the frequency limited range of the LFE (Low Frequency Effects) channel.
- Two full frequency range channels for speakers at the front: Left (L) and Right (R).
- One full frequency range channel for speaker between left and right: Center (C).
- Two full frequency range channels for surround speakers at the rear: Left Surround (LS) and Right Surround (RS).
- One Low Frequency Effects channel (LFE).

5.1 surround (also known as 3-2 Stereo: three front speakers and two rear speakers) delivers five discrete audio channels and 1 LFE channel from a six-channel source. Source media, usually DVD and satellite/digital cable, is often branded with "Dolby Digital" and/or DTS logos. Publically available digital discrete coding formats are Dolby Digital 5.1, Dolby AC-3, and DTS (Digital Theater System).

Placement: 5.1 speaker layouts should conform to the ITU-R BS.775 standard:



The ITU (International Telecommunication Union) standard states that the left and right speakers are located at ±30°, while the rear speakers should be positioned approximately ±110° off center axis.
- Three identical front speakers.
- Equal arrival time (radius) between mix position and each speaker.
- If placed behind a silver screen, the screen should be acoustically transparent.
- Surround speakers placed within 100° and 120°.
  If more than two surround speakers, symmetrically placed on radius between 60° and 150°.
- LFE runs to separate subwoofer or equally to left/right, and is played back at +10 dB level.

Mounting the microphone
The 5100 has a standard 3/8" microphone stand thread above and below the unit. Any third part mounting accessory having 3/8" thread can be mounted – microphone stand, hand grip or the like. Remove the inner thread a the bottom to acces American 5/8" thread.

Connecting and disconnecting the cable
The 5.1 output of the 5100 runs through a multi-pin Lemo connector carrying all six channels electronically balanced. The enclosed DAO5105 5 m (16 ft) six-pair Mogami cable breaks out to six Neutrik XLR-M connectors. Other cable lengths are available as optional accessories.

Note
To align the two red marks, gently push the connector into the terminal beneath the 5100 until it locks with a click.
Disconnect the cable by drawing it away from the 5100 at the cylinder. This will unlock the connector.

Cable configuration

5.1 channel	Cable no.	Color code	Memory aid
L	1	Yellow	**L** in ye**L**low and **L**eft
R	2	Red	**R** in **R**ed and **R**ight
C	3	Orange	Combination color between yellow and red
LFE	4	Gray	Gray (LFE) does not have full bandwidth
LS	5	Blue	Dark colors for Rear Channels: **L** in B**L**ue and **L**eft, **R** in G**R**een and **R**ight
RS	6	Green	

48V Phantom power should be applied to all six cables. Note, the LFE output is only active when phantom power is applied to Left and Right.

Application notes
The DPA 5100 can be used handheld, mounted on a camera, on a microphone stand or suspended. Further shock absorption is not necessary.

DPA OC5100 Outdoor Cover
When using the 5100 outdoors, always mount the DPA OC5100 Outdoor Cover, which both protects the unit against rain and reduces wind noise.

Extension units
When mounted on a handheld camera, it may be necessary to increase the distance between the microphone and any noise sources such as camera zoom and breathing.

The LFE output
The LFE output is derived from a sum of the left and right microphones and is running through a low pass filter at 120 Hz and is attenuated 10 dB conforming with the LFE level standard.

Mixing the signals
The unit is in perfect surround balance and does not need any level off-sets. Simply gain all microphones equally (including the LFE signal). However, some applications may benefit from minor adjustments to achieve the desired level balance on the 5.1 outputs:

- News gathering/interview: Attenuate all channels but center
- Concert hall with large distance to source: Attenuate rear channels
- Acoustical zoom function: Attenuate all channels but center

Adding time delay to rear channels
To increase the sensation of spaciousness it is a recommendable trick to add time delay to the rear channels by typically 10 – 15 ms (corres-ponds to the rear micro-phones being placed approximately 3 – 5 m (10 – 16 ft) behind the front microphones). This technique works best when the surround directions are consistent, and may lack front-to-back localization accuracy when recording moving surround environments from the rear.

Fold-down to stereo or mono
The surround signals from the 5100 can easily be folded down for stereo or mono. Since the three front microphones are time coincident, no comb filtering occurs when summing L, C and R.

Down-mix algorithms

5100 surround outputs	Stereo fold-down		Mono fold-down
	L	R	Mono
Left	0 dB	-	-3 dB
Right	-	0 dB	-3 dB
Center	-3 dB	-3 dB	0 dB
LFE	+7 dB	+7 dB	+10 dB
Left Surround	-6 dB	-	-6 dB
Right Surround	-	-6 dB	-6 dB

Care of microphone
DPA 5100 is designed to be very robust and protective materials are used in the construction, including the extremely strong black fabric. Do not try to clean the microphone as it may be damaged. Avoid all kinds of spray or fluids containing chemical components to remove static electricity on or close to the microphone as this could cause permanent damage to the pre-polarized layer in the capsules.

DPA 5100 is very resistant to water and can easily be used outdoors with the OC5100 mounted, but keep it away from unnecessary exposure to water and cleaning fluids.

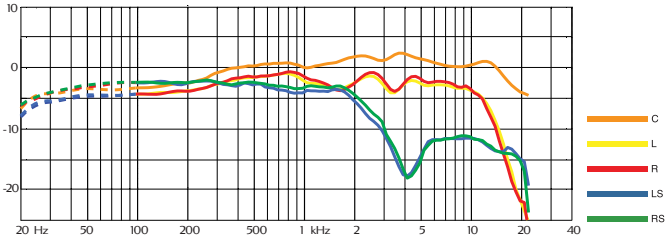
Hum issues DPA5100
If low frequency hum issues occur with DPA5100, it is advisable to check for proper ground for the main power supply connection for the microphone preamplifier. Especially on mobile battery operated equipment, when operated with power supply, it is of great importance to ensure ground for the power supply. Due to the high current consumption of the six channels in DPA 5100, it is more sensitive to ground current flows than other standard mono channel microphones.

Specifications & Graphs for DPA 5100

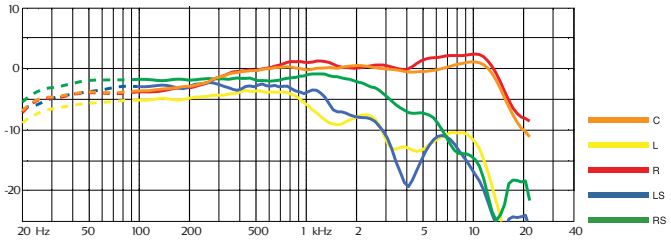
CRITERIAS	LEFT, CENTER & RIGHT	LEFT SURROUND & RIGHT SURROUND	LFE	UNIT
Directional characteristics	Directional	Directional		3 / 2 / 1
Principle of operation	DiPMic® (Pressure, with interference tube) and separation baffles	Pressure, with separation baffles	Electronically derived from L + R	
Cartridge type	Pre-polarized condenser element	Pre-polarized condenser element		
Frequency range	20 Hz - 20 kHz 200 Hz-16 kHz (±3 dB)	20 Hz - 20 kHz 100 Hz-12 kHz (±3 dB)	20 Hz - 120 Hz (±3 dB)	
Sensitivity, nominal ±3 dB at 1 kHz	26 mV/Pa	28 mV/Pa		
Equivalent noise level, A-weighted	Typ. 18 dB(A) (max. 21 dB(A))	Typ. 20 dB(A) (max. 23 dB(A))		
S/N ratio (A-weighted), re. 1 kHz at 1 Pa (94 dB SPL)	Typ. 76 dB(A)	Typ. 74 dB(A)		
Total Harmonic Distortion (THD)	<1% up to 123 dB	<1% up to 123 dB		
Dynamic range	103 dB	103 dB	100 dB	
Max. SPL, peak before clipping	132 dB	132 dB		
Output impedance	50 Ohm	50 Ohm	50 Ohm	
Cable drive capability	100 m (328 ft)	100 m (328 ft)	100 m (328 ft)	
Output balance principle				Active signal balanced
Common Mode Rejection Ratio (CMRR)	60 dB, 50 Hz - 20 kHz	60 dB, 50 Hz - 20 kHz	60 dB, 50 Hz - 20 kHz	
Power supply				Phantom power P48
Current consumption	Typ. 5 mA (max. 5.5 mA)	Typ. 5 mA (max. 5.5 mA)	Typ. 5 mA (max. 5.5 mA)	
Connector				Lemo multipin
Color				Black
Dimensions				
Weight				530 g (18.7 oz)
[LxWxH]				195/240/140 mm (7.7/9.4/5.5 in)
Capsule diameter	5.4 mm (0.2 in)	5.4 mm (0.2 in)		
Cable (length/color/diameter/connector)				5 m (16.4 ft)/black/9.3 mm (0.4 in)/XLR
Maximum output voltage	1.8 Vrms/2.5 Vpeak	1.8 Vrms/2.5 Vpeak	1 Vrms/1.4 Vpeak	
Polarity	Positive	Positive	Positive	
For L/R og LS/RS				
Matching front/back (frequency response and sensitivity)	All 3 microphones are factory selected to the unit typical within 1 dB.	Both microphones are factory selected to the unit typical within 1 dB.		

Frequency responses for DPA 5100

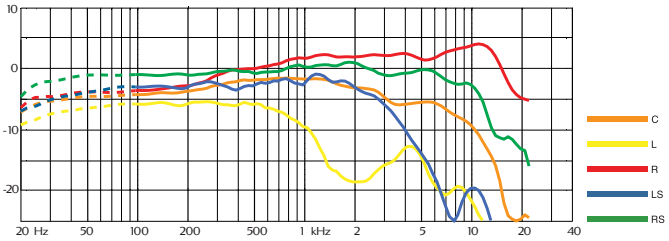
Typical frequency response of DPA 5100 at 0 degrees



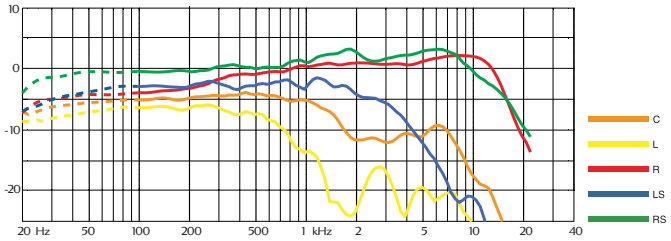
Typical frequency response of DPA 5100 at 30 degrees



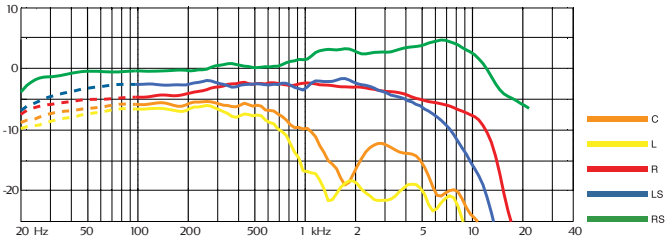
Typical frequency response of DPA 5100 at 60 degrees



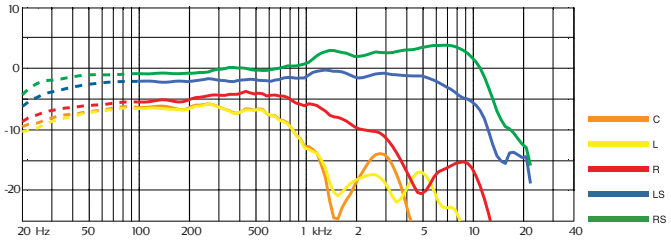
Typical frequency response of DPA 5100 at 90 degrees



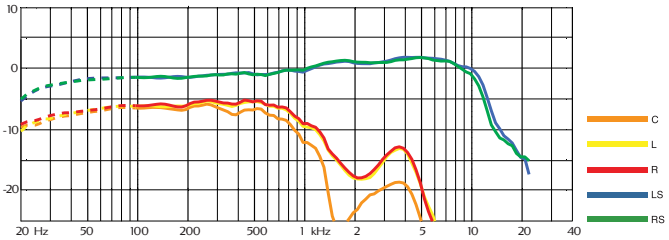
Typical frequency response of DPA 5100 at 120 degrees



Typical frequency response of DPA 5100 at 150 degrees

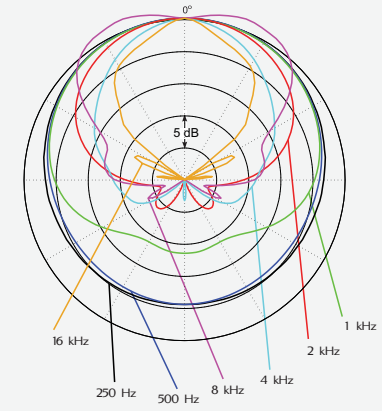


Typical frequency response of DPA 5100 at 180 degrees

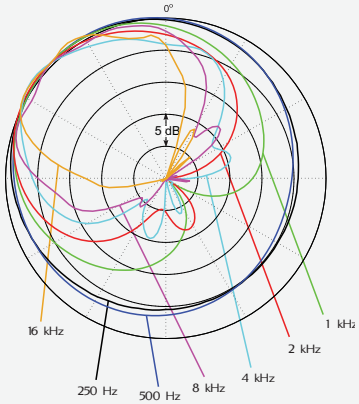


Polar patterns for DPA 5100

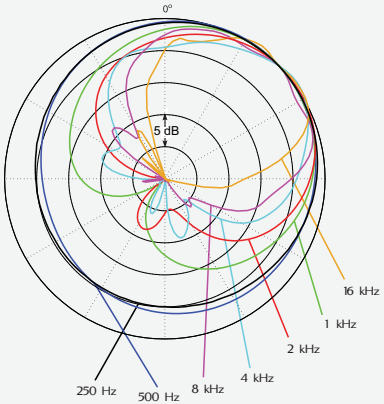
Typical directional charateristics of DPA 5100 (normalized)



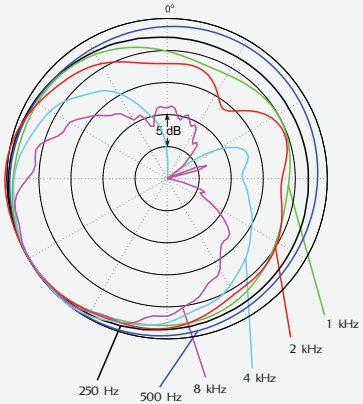
Center



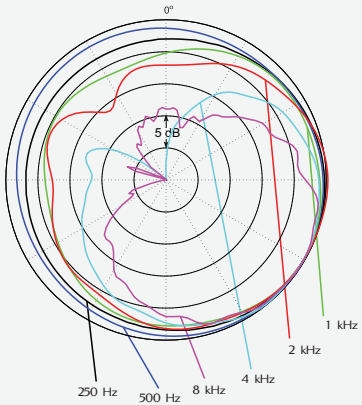
Left



Right



Left Surround



Right Surround

Accessories included

DAO5105 Lemo 2B-series 18-pole Female to 6xXLR-M, 5 m (16.4 ft)
OC5100 Outdoor Cover for DPA 5100
DDB2251 Thread adapter 5/8" – 3/8"

Accessories available

DAO5110 Lemo 2B-series 18-pole Female to 6xXLR-M, 10 m (32.8 ft)
DAO5120 Lemo 2B-series 18-pole Female to 6xXLR-M, 20 m (65.6 ft)
DAO5150 Lemo 2B-series 18-pole Female to 6xXLR-M, 50 m (164 ft)
DUA0100 Stand Extension, 100 mm (4 in)
DUA0500 Stand Extension, 500 mm (20 in)
SH5100 Suspension Hook for DPA 5100
DDA5100 Thread for external center mic. for DPA 5100

Service and repair
Do not service the DPA 5100 yourself. Do not try to open the unit, or it will have to be resealed professionally by the factory. If the fabric is torn, the unit will suffer from less wind and water protection.

Products from DPA Microphones are extremely stable and there should not be any significant change in the specifications with time and use. If, however, you are not totally satisfied with the characteristics exhibited by this product, please contact your nearest DPA Microphones representative for further details of service and the repair facilities that are available.

Warranty
The DPA 5100 is covered by a standard two-year limited warranty on both mechanical functionality and documented specifications as long as the items are not mistreated, abused or modified in any way. In case of warranty claim your invoice is your warranty registration.

CE marking
The CE mark guarantees that the product conforms with relevant directives approved by the European Commission.
EMC directive: 89/336/EC, amended by 92/31/EC and 93/68/EC
Low voltage directive: 72/23/EC, amended by 93/68/EC

CE

Environmental policy
This product is comprised by the waste (WEEE) directive and should not be thrown in the garbage bin when obsolete. Instead, return it to your local DPA representative (or DPA Microphones directly) who will dispose of the product in accordance with the current environmental standards.

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